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THE SPECIAL POULTRY NUMBER.

OWING to unforeseen circumstances it has been found necessary to delay the issue of the Special Poultry Number. This will appear as a special issue in the January number and the subject matter will contain numerous original articles showing pioneer work done by members of the profession on this most important branch of Veterinary Science.

THE DOCTORATE DEGREE IN VETERINARY SCIENCE.

THE articles which have been published on the above, illustrating what is done in this respect in other countries and suggesting that the time is ripe for Great Britain to follow the lead, have brought considerable correspondence to the Editorial desk, all of which is in favour of this idea being adopted and verifying the social advantages in particular. Letters, especially from our graduates in South Africa, emphasise the latter in the words (referring to the right to use the title of " doctor ") " it does make a big social difference, not only with the public but also with scholastic connections."

The British Veterinary Profession is always talking of its want of social position and the same thing used to be found a favourite topic of conversation in other countries. The University degree and the Doctorate have altered all this in a most remarkable way, and to-day in Germany, France, Italy, and other Continental countries, the Doctor of Veterinary Medicine has a start in life which enables him to hold his own socially right from the start, in a way which he could never do before.

It is true that in all professions individuality counts for much, but individuality has a better opportunity to shine out when it starts by its own right some few steps up the ladder rather than on the bottom rung.

We invite more correspondence upon this very important subject.

A MEMORABLE 1930.

THE Year 1930 will always be a memorable one in veterinary history, for not only is it the year in which the first Congress of its kind at which, since the Great War, colleagues of all nations have met in amicable discussions and friendly gatherings, but nearly 1,900 delegates—representing 56 countries and colonies—passed a number of profitable days together without a single unpleasant incident. Truly

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a testimony to the good fellowship for which Great Britain is so universally known throughout the world !

THE REBUILDING OF THE ROYAL VETERINARY COLLEGE.

Progress is at last being made in the project for rebuilding the Royal Veterinary College, and the Authorities are now only about £50,000 off the capital sum (£250,000) which the present Government have stated to be the minimum necessary for this purpose. All old graduates and well wishers of the old place are requested to put their efforts forward just once more for a final throw ; and the slogan issued by the Appeal in that well-known Sporting paper *Horse and Hound* expresses exactly what, if accomplished, will give the desired response at once. The Editor suggests that there must be 50,000 sporting folk and animal lovers, and that if they can each be persuaded to subscribe £1 the result will be attained. Failing this the Governors have stated that they will be compelled to commence to close down at the end of the Summer Session and to take no more students. *This would indeed be a national calamity and one which would take years to repair ; for, at the present time, it is utterly impossible to find sufficient graduates to fill the Colonial and Preventive Medicine State appointments ; whilst to supply the needs of the private practitioner in regard to finding assistants is quite impossible.*

Should veterinary study be interrupted the result to the pedigree and general live stock of this country would be calamitous.

We venture to hope that this will never come to pass and that the Government will soon see the danger and use their utmost endeavours to see that such a contingency cannot possibly come to pass. That the country is awakening to the true state of affairs is well illustrated by the following paragraph which appeared a few days ago in the *Bristol Times and Mirror* :—

> " Every cattle farmer in the country must be concerned about the future supply of Veterinary Surgeons. We want not only the best we can get, but an adequate number of them ; and the threat to the very existence of the Royal Veterinary College has impressed us all with the grave danger involved in the possible closing down of that splendid institution. What would happen to the supply then, no one knows. But we can guess what loss and inconvenience would fall upon the farming community in the absence of qualified Veterinary Surgeons, and the temptation there would be for men without scientific training to usurp their functions. If the Government can do nothing else surely they can see to it that the Royal Veterinary College is preserved to us."

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General Articles

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THE VALUE OF GRAZING FOR FATTENING PIGS.

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THE value of grazing to ruminants such as cattle and sheep, and to other herbivorous animals such as the horse, is obvious. The pig on the other hand is omnivorous, and its stomach is not specialised to deal with only one class of food. There is, as a result, some difference of opinion and doubt concerning the relative importance of grazing in the feeding of pigs. While the wild pig in natural surroundings is not specially constructed to obtain the bulk of its food from grass, the anatomy of its stomach and head indicates that its natural source of food is to be found under the surface of the ground or buried in masses of fallen leaves or in matted tufts of grass. This natural food consists largely of roots and tubers, to which must be added such miscellaneous extras as stolons, rhyzomes, fungi, fallen nuts and fruits, insects and small animals. As even the most nourishing of roots contain a relatively high proportion of water, while many of them also contain considerable proportions of fibre, it is incorrect to imagine that the pig must necessarily receive a ration entirely composed of concentrates. The problem therefore centres round the relative value of grazing to pigs at different times and in different conditions.

Generally speaking it can be said that mature pigs, that is to say breeding pigs and large fattening pigs, require a certain proportion of bulky food in their daily ration, otherwise the small amount of concentrates required to supply the energy requirements would not supply sufficient bulk to satisfy the appetite. In the case of younger animals, say those under 150 lb. live weight, the conditions are different. Up to this weight the amount of concentrated foods, mostly in the form of cereals, required to produce maximum growth provides a satisfactory amount of bulk, though practical experience suggests that some of this can be successfully replaced by more bulky material if any advantage is to be obtained by doing so. In so far as purely fattening pigs are concerned, there are two main advantages which may accrue from the feeding of pasture. In the first place grazing may supply some factor which is necessarily absent from a ration which appears to be otherwise

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well balanced. Secondly, pasture or green crops may replace either the protein or the carbohydrate portion of the ration should the cost of the latter two make it economical to do so.

Although a considerable number of experiments have been carried out on the value of grazing most of them are indefinite, and while the results show the difference in rapidity of growth and economy of food consumption between pigs fed in sties and those fed outside on pasture, few of the writers analyse these results to show the various factors involved in grazing. Of these the more important may be tabulated as follows :—(1) palatability of food ; (2) laxativeness of food ; (3) bulk ; (4) supply of vitamins ; (5) supply of organically combined minerals ; (6) access to soil (supply of inorganic materials) ; (7) exercise of grazing and rooting (i.e. a natural form of exercise) ; (8) exposure to sunlight ; (9) provision of cheap form of protein.

That most of these are of value in the feeding and management of breeding pigs is now generally recognised. It is their value for fattening pigs which requires some further elucidation. As regards palatability, the pig is notoriously a greedy feeder, and it is as a rule only when the ration is badly balanced that the appetite is impaired. Constipation might be expected as a common occurrence in the case of an animal receiving only concentrated foods. Yet a balanced ration such as one composed of 65 parts barley, 25 parts sharps and 10 parts fish meal can give good results with little evidence of this trouble, and while the laxative effect of pasture is always valuable it does not appear to be necessary for successful results. Until pigs are about 150 lb. live weight their requirement for bulk appears to be almost completely satisfied by the concentrated food which they can digest. Above that weight there is a tendency to eat a small amount of the litter unless other bulky food is provided, but it does not appear to be until a weight of about 250 lb. is attained that a pig really requires a fair proportion of bulky food.

In the case of vitamins there is liable to be some confusion of thought. Several experiments have been carried out in which pasture in addition to an artificial and vitamin deficient ration has proved to be protective. Where, however, the ration is normal and well balanced there is evidence that the vitamin requirement of the fattening pig is likely to be satisfied.

Access to soil not only means access to a certain amount of inorganic minerals, but it supplies the grit for which pigs crave, especially when on a forcing ration. A good supply of ashes and soil, however, can easily be fed in pens inside. The value of exposure to sunshine appears to be definite, as is shown by the following American results. Evvard

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and others compared two pens of pigs both getting maize, meat meal and minerals. One group was fed under cover and the other outside. The latter, exposed to sunshine while feeding, only required 391 lb. of feed for every 100 lb. gain, whereas 425 lb. were required by the group not exposed to sunshine. Similarly Bohstedt and others found that direct sunshine was beneficial to fattening pigs. In three experiments, the pigs, 27 in all, which were fed a deficient grain ration in outdoor brick-paved pens, made on the average a daily gain of 0.63 lb. Their thigh bones had an ash content of 56.8 per cent. and a breaking strength of 427 lb. Where the same grain ration was fed to 19 pigs in two experiments conducted indoors, they made an average gain of only 0.30 lb. per day. Their thigh bones analysed 55 per cent. ash and had a breaking strength of only 249 lb. As in the case of vitamins, one has to appreciate that the marked results obtained with animals on deficient rations are not generally applicable where the ration is normally well-balanced. The difficulty with regard to the value of pasture as a source of cheap protein is that the protein is intimately associated with the more or less indigestible fibre, which thus becomes a limiting factor.

Compared with these advantages, which may be credited to grazing, the disadvantageous factors are few. They may be briefly summarised as :—

1. Loss of energy through exposure to cold.
2. Loss of energy through too much exercise.
3. Necessity of ingesting too much fibrous food.

Passing from these theoretical considerations the following experiments carried out at the Rowett Research Institute may be quoted. In the first case the same balanced ration was fed to two groups of which one was kept all the time in an inside pen with a concrete floor, and the other was kept in a large run on pasture for the first ten weeks and was then brought inside for the remaining two weeks of the experiment. Table I summarises the results.

Table I.

	Group I.	Group II.
Average number in group	10	10
Average initial weight	52.3 lb.	52.3 lb.
Average gain per pig per day—		
19/10/25 to 30/12/25	1.04 ,,	1.02 ,,
31/12/25 to 15/1/26	1.53 ,,	2.09 ,,
Food eaten per 1 lb. gain—		
19/10/25 to 30/12/25	3.73 ,, (inside)	3.90 ,, (outside)
31/12/25 to 15/1/26	4.33 ,, (inside)	2.97 ,, (inside)

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It will be seen that during the experimental period, which was in the first part of winter, such small difference as was observed was in favour of the pigs kept inside. On the other hand when the outside pigs were taken in they showed a very marked superiority over those that had been inside all the time.

A further experiment was carried out later in order to get fuller information. In this case there were three groups all getting the same standard ration. Of these, two groups were fed inside, one getting the basal ration only, while the second was given as much freshly cut grass daily as it would consume. A third group was kept all the time on the same pasture as supplied the cut grass and was provided with wooden floored huts for sleeping in. The concentrate ration for the first part of the experiment consisted of cubes made up as follows :— Sharps, 30 parts ; maize meal, 20 parts ; barley meal, 40 parts ; meat and bone meal, 8 parts ; ground limestone, 1 part ; salt, 1 part.

At the end of two months the pigs inside getting no grass, soil nor extra minerals were not making normal gains, and the ration for all three groups was changed to the following :—Sharps, 20 parts ; barley meal, 20 parts ; boiled potatoes, 200 parts ; separated milk, 100 parts ; salt, 1 part.

The change of food resulted in an immediate improvement in group I, which was not, however, reflected in group III on pasture. It has to be noted, however, that the change of food occurred in the middle of September, and at this period there was a considerable increase in the dry matter of the grass as determined at approximately ten day intervals. Observation confirmed that this was due to the ripening of the pasture constituents and to the increased development of fibre in the plants. The pasture at this period had really ceased to be of much significant value for the purpose of feeding to pigs. The results of this experiment are briefly outlined in the following table :—

		Group I.	Group II.	Group III.
		Concentrates only. Inside.	Concentrates + cut grass *ad lib.* Inside.	Concentrates + grazing outside.
Number in group		10	10	10
Average weight at beginning, lb. ..		76.9	77.9	78.5
15/7/29 to 13/9/29	Average gain per day ..	0.87	1.00	1.24
	Average concentrates (dry matter) per 1 lb. gain ..	4.23	3.94	3.53
	Average grass (dry matter) per 1 lb. gain	..	0.106	(?)
	Average total food (dry matter) per 1 lb. gain ..	4.23	4.05	3.53+

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		Group I.	Group II.	Group III.
		Concentrates only. Inside.	Concentrates + cut grass *ad lib.* Inside.	Concentrates + grazing outside.
13/9/29 to 2/11/29	Average gain per day ..	1.36	1.38	1.28
	Average concentrates (dry matter) per 1 lb. gain ..	3.75	3.92	4.05
	Average grass (dry matter) per 1 lb. gain	..	0.15	(?)
	Average total food (dry matter) per 1 lb. gain ..	3.75	4.07	4.05+

Taking first the earlier period and comparing groups I and II it is seen that the addition of cut grass led to increased daily gains and to a reduced consumption of food per lb. of gain. The difference between groups II and III, however, indicates that factors other than food supply were at work, and exposure to sunlight appears to have been the most prominent of these. In comparison with the results in the second period and with numerous other results, it would appear that the concentrate ration was not, by itself, adequately balanced.

As already mentioned the grass during the second period was becoming old and fibrous, and this fact probably accounts for the increased dry matter consumed per 1 lb. gain in group II as compared with group I. That grass added to a milk diet does not produce any improvement as measured by the similarity of daily gains is in confirmation of other results. A comparison of groups II and III in the second period, in which the outside pigs showed both a smaller gain and a larger food consumption, indicates that a decrease in sunlight and exposure to cold and damp weather were having an adverse effect.

Taking the results of the two experiments reported in conjunction with other published results it would appear that where a ration for fattening pigs is well balanced, the addition of grazing over the whole fattening period is not of any special value. Many investigators, however, have reported that where pigs were partially fattened on pasture and then finished inside they have shown more rapid gains, and in several cases more economical gains, than pigs not having access to pasture. From another point of view the pig is of a much more active temperament when young and does not so readily accept close confinement till it begins to put on fat in addition to growing. The general application to practice of these conclusions would appear to be that the best management lies in allowing pigs access to pasture

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when they are young, say for six or eight weeks after weaning, and then finishing them off inside.

No information was obtained from the two experiments reported as to the amount of pasture or green food which can economically be fed to fattening pigs, but some interesting experiments carried out by the Department of Agriculture of the Irish Free State and reported by Sheehy are of interest in this connection. The green food, consisting of rape, cabbages and vetches, was fed to pigs confined to sties and the amounts consumed were accurately measured. Separated milk was fed along with meals to all groups. The results of four experiments at different centres are summarised as follows. The value of a separated milk and meal ration is not enhanced by the addition of green food. Green food, on the other hand, may be economically substituted for part of either the separated milk or meal portion of a pig's diet. The quantity of green food which may be thus utilised is small, being limited by the nature of the pig's digestive organs. If the green food is of good quality, a quantity which is equivalent to an average of 6 lb. per pig per day over the fattening period may be fed economically, this replacing 3.7 lb. (about 3 pints) of separated milk and 0.7 lb. of meals. The replaceable proportions are stated to be approximately :— meals, 1 lb. ; separated milk, 6 lb. ; green food, 9 to 10 lb.

In the case of grazing, it has to be remembered that the relative amounts of green food consumed by grazing pigs will vary very widely according to the condition of the pasture as affected by seeding, manuring, season and stocking. As compared with green soiling, therefore, it will be impossible to effect any control over the above-mentioned proportions, which confirms the conclusion that it is more efficient to limit grazing to a short period at the beginning of the fattening pig's life.

SUMMARY.—1. Several factors are involved in the grazing of pigs, many of them advantageous, some of them not. In the case of breeding pigs nearly all of the advantages are effective, and the disadvantages do not, as a rule, apply.

2. In the case of fattening pigs a number of experimental results indicate that when a ration is otherwise properly balanced the addition of green food makes little if any difference. When young pigs are grazed for a few weeks after weaning, however, the advantages of exercise and exposure to fresh air and sunlight lead to an improvement in constitution which is reflected in relatively increased gains when the animals are fattened inside.

3. Where green food must be consumed as being the cheapest available foodstuff, it may be fed, preferably cut and supplied in the sties, at a rate not exceeding an average of about 6 lb. per head daily.

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THE DEVELOPMENT OF THE BRITISH RABBIT INDUSTRY.*

By J. N. PICKARD, PH.D., B.A.,

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IN days gone by the rabbit was looked upon solely as a pet of the schooldays and as a hobby for the working man fancier. Even in these cases it served a useful purpose, for in looking after their pets school children would learn much about biology and would also undertake responsibilities which would assist them later in their lives. Fanciers were taught the art of sportsmanship, to take their losses with a smile and their wins without exultation. Rabbit keeping is a clean occupation, and keeps many a man in these days from other and worse ways of passing the time.

Until the Great War, rabbit keeping was of little real importance in the eyes of the nation. When in the early years of the world conflict famine threatened this country, many turned their attention to possible ways and means of increasing the food supply of the nation. For this purpose the rabbit was found to be highly suitable as it was easy and inexpensive to keep, the food largely consisting of greenstuff gathered from the country lanes and of waste household and garden scraps. Moreover, no great knowledge was required for the successful breeding of rabbits for table purposes, as they reproduced themselves freely and were easy to rear. The meat was found to be excellent, and rabbit breeding to supply the table with fresh meat was undertaken by cottagers, smallholders and many other persons.

Rabbit flesh contains 25.5 per cent. protein, according to the United States Department of Agriculture's Farmers' Bulletin No. 1090, while other meats such as chicken, beef, veal and mutton contain appreciably less. As this is one of the most valuable constituents of food, the advantage of rabbit meat as a household dish is obvious. It is also a pleasant dish to eat, which can, when cooked by an expert, be compared to the tenderest chicken. There still exists, however, a certain prejudice against the flesh of hutch-reared rabbits for table purposes. This is most unfortunate and is entirely without foundation. In point of fact, hutch-reared rabbits supply a more tender and better flavoured flesh than do the wild ones. This can be explained by the fact that the former are fed on only the best of foods and are killed at the most tender age, whereas wild rabbits are frequently old and lack the pleasing flavour of those which have been hutch fed.

* A paper presented to the 4th World's Poultry Congress, 1930.

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That the keeping of rabbits for flesh production is of some considerable economic importance to this country may be gauged by the fact that in 1928 we imported over 243,000 cwts. of rabbit flesh at a cost of over £745,000. Of course, a proportion of these were wild rabbits, but many were hutch-reared rabbits from the Continent. It is obvious therefore that there are considerable opportunities even at the present time for a development of this branch of the rabbit industry.

The value of rabbit carcases sold wholesale varies, according to season, from 7d. to 1s. or more per pound, the average value for a carcase being between 2s. and 2s. 6d. A profit can, and actually has, been made out of rabbit breeding on a large scale for meat production alone. Many small holders and cottagers have found this to be a valuable sideline to their other activities.

During the war-time " boom " in rabbit for flesh production, the breeds most generally kept were Flemish Giants and Belgian Hares. It was later found that smaller varieties, with a lower proportion of waste, were preferable as they matured more rapidly and thus brought a quicker return. Attention was turned to such breeds as Dutch and English, and certain breeders studied the situation as it existed on the Continent. It was soon realised that there were many more breeds there than in Great Britain, and that the Continental breeder sold his skins, not to a rag and bone merchant, but to fur dealers, often securing considerably higher prices for these than for the carcases. A few British breeders, more enterprising than the majority, imported some of these Continental varieties, and to them we owe the genesis of the rabbit fur industry of this country. The breeds imported were Beverens and Chinchillas ; Havanas and Argentes had been imported before, but did not attract much attention until after the two breeds first named had secured a firm footing in the British rabbit world. Other varieties have been imported, the latest of which is the Rex.

With that enthusiasm found in all British breeders of livestock, rabbit keepers in this country set themselves the task of improving the available breeds and, by means of crossing, producing new varieties to meet the demands of furriers. In both of these objects a considerable degree of success has been attained, and there is no doubt but that British specimens of most varieties would hold their own with the best found in Europe. New breeds have been evolved amongst which Sables, Squirrels, Smoke Beige and Silver Foxes probably rank as the most important.

In the early days of the pelt industry, few high grade animals were produced, there being found a great variation in the quality. Now, however, this has greatly improved, and the proportion of inferior

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grades is not so marked although there is still considerable room for further advancement with regard to this. Many breeders, some of them without the excuse of being novices, although in possession of first grade animals, do not produce first grade pelts. This is generally due to their pelting their stock when not in full coat, skinning the rabbits badly or failing to stretch the skins in the approved fashion. More education is needed with regard to this, and although many articles are written and many lectures given during the year on these very subjects, the improvement is only slow.

We now have rabbits which produce pelts that, after being made up by an expert furrier, are hardly distinguishable from real chinchilla, sable, squirrel, marten or fox as the case may be, without recourse having been made to dyeing. This is one of the great advantages of the British rabbit pelt, for there is much less risk of contracting skin diseases if the furs worn are in their natural colours and undyed. Rabbit furs wear exceedingly well and are comparatively cheap, being within the reach of almost everybody's purse. A still further word in support of the rabbit pelt industry may be said on humanitarian grounds. Wild animals caught for the purpose of supplying furs are frequently left in traps without food or water for some considerable time before being destroyed. Rabbits bred for the same object, on the other hand, are killed instantaneously after having been well fed and housed for the duration of their comfortable, if short, lives.

The rabbit fur industry has grown to some considerable size during recent years. There are many farms keeping stocks of some hundreds of rabbits, and a number with stocks of several thousands. This alone, we think, definitely proves that pelt production from rabbits is—or at least can be—a profitable undertaking if run on sound commercial lines. Large numbers of skins are imported annually into this country, but as they are mainly of inferior quality, their competition, we believe, is not of serious consequence to the British breeder, for now we have pelts that in their natural state are suitable for every style, for every figure and for every complexion.

The youngest branch of the rabbit industry is that concerned with the production of wool from Angora rabbits. Since the year 1920, this developed rapidly and was, without doubt, the most profitable branch of small livestock husbandry. In the Autumn of 1927 the wool was realising 40s. or more per pound. The price fell to 35s. in February, 1928, and from April of that year until the Autumn of 1929 the market for Angora wool in this country was very nearly closed. This has been due to several causes, the two chief ones being foreign competition and the marketing during the boom period of very inferior materials as

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" Angora " which frequently contained little or no real Angora rabbit wool. The quality of the wool produced on the Continent has greatly improved during the recent years, and is now but little behind the best grown in this country.

Many breeders have recently taken up the hand spinning of Angora yarn and a few have gone even further and are weaving it into materials. These sidelines could be developed into both interesting and profitable rural industries. " Angora " is the warmest, softest and lightest of materials and is comparatively cheap to buy as high class Angora overwear is being produced in this country at a price less than that of Cashmere. Breeders should turn their attention to increasing the production of their rabbits and at the same time decreasing the cost. It is neither likely nor desirable that another " boom " period should occur, and the object of all interested in the development of the Angora wool industry should be to secure the fixing of Angora wool at a stable price of about 30s. per lb. for the first grade.

The fourth side of rabbit breeding should not be overlooked. This is the purely Fancy branch, which serves a most useful purpose in maintaining or advancing the average standard of the different breeds. Probably the majority of breeders belong to this section, and they do invaluable work by breeding rabbits of the highest possible quality, which the true rabbit industrialist purchases with the object of improving his stock. Shows are held at different times of the year in practically all districts, and these do much to stimulate interest amongst the general public as well as showing where the best specimens of each variety are to be found.

There are a number of societies and clubs guarding the interests of different breeds of which the more important are the Universal and Southern Angora Rabbit Clubs, the National Chinchilla Rabbit Club, the British Sable Rabbit Club and the British Rex Rabbit Society. In addition to these, is the British Fur Rabbit Society, which was originally instituted for the Beveren variety alone, but has now taken under its wing all the recognised fur breeds. Largely through its activities, the Fur Board, Ltd., was established by means of a grant from the Ministry of Agriculture and Fisheries. This organisation purchases pelts from shareholders and thus serves a most useful purpose, as rabbit pelts can only be marketed satisfactorily in large quantities. Without the Fur Board, therefore, the smaller breeders would be at the mercy of unscrupulous fur dealers.

The past eighteen months have been noteworthy in the rabbit world for the institution of the National Marking Council and the National Rabbit Council. It is thought by many that these new

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organisations will have far reaching effects and will do much to stabilise the position of the rabbit industry in this country. The former has originated a scheme for the marking and recording of rabbits, which will be of considerable assistance in the checking of records and the keeping of pedigrees.

The National Rabbit Council has been instituted with the object of combining all the existing societies and clubs catering for rabbits into one organisation, which will be able to voice the needs of the entire rabbit world as and when necessity for such action arises. It is in no way a rival with already existing clubs and societies, but with their support will strengthen them and aid them in many directions. It will be able to do much to help forward the cause of the rabbit with the British public by means of propaganda work and has already done a certain amount in this direction. A Year Book is issued which reviews the present position in each branch of the industry and in each breed, and although the Council has only been formed for about a year it already represents some 2,100 breeders, and has had an annual income during its first year of over £200.

To summarise the present position in the rabbit world, it may be said that all branches have been passing through a hard time recently but that there are distinct signs of increased prosperity in sight. The aim of all interested in the industry should be to draw the attention of the public to the products, to improve the average quality of the products, to increase production and to lessen costs.

SOME DISEASES OF RABBITS.*

By HENRY GRAY, M.R.C.V.S.,
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THE majority of diseases of rabbits, especially the more deadly contagious or parasitic ones, are preventible by strict hygienic means. In these days of intensive rearing of these animals, sending them to shows or to stud or importing fresh blood from other parts of the country or from abroad, or improper methods of feeding and management, especially under dirty conditions, all tend to increase the number of maladies and their incidence.

As the diseases are too numerous to deal with within the compass of a paper of this description, we shall only consider the more common ones in as brief a manner as possible.

* A paper presented to the 4th World's Poultry Congress, 1930.

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Coccidiosis.—This is the commonest malady of the young rabbit, and it occasions more deaths among them than all the other complaints put together.

It is most frequently encountered between the ages of 6 to 8 weeks, but may be seen in young rabbits barely 3 weeks of age, and rarely in those over six months old. It occurs in two forms: the intestinal and the hepatic. The intestinal form is found in quite 95 per cent. of those that die of the complaint, and the liver form in only 5 per cent. In the latter, however, the intestinal walls as well as the internal lining membrane of the biliary canals are invaded.

Most authorities are of opinion that the causal organism of both forms is one and the same, whereas others consider there are two distinct species of coccidia: *Eimeria stiedae* attacking the liver, and *Eimeria perforans* the intestine. The different views of the ætiology are not new, for they have been oscillating from one point to the other during the last 55 years or more. Whichever view is correct does not matter much in practice. What the breeder requires is to know how to avoid its ravages, and when it attacks his stock how to overcome it or lessen the mortality from it.

The disease is not hereditary and only arises from the ingestion of segments of coccidia. It is said on good authority (Pérard) that when the segmented oöcysts of *Eimeria stiedae* are ingested, it takes three or four weeks to destroy the rabbit although diarrhœa with parasites in the stools appears from 6 to 8 days, and the liver can be felt to be enlarged at the end of a fortnight.

In the case of *Eimeria perforans* diarrhœa usually appears 4 or 5 days after the ingestion of the segmented oöcysts, and remains persistently profuse until death arises during or soon after an attack of convulsions. On the contrary, and especially during the Winter months, there is no diarrhœa, but rather the opposite, constipation is observed in many animals that die of this malady. Animals affected with the liver form live for some time, waste away and manifest a distended abdomen, or what is commonly known as " pot-belly."

When the infestation in the intestinal form is heavy, the disease runs its course in six or seven days after showing profuse diarrhœa. In many instances, however, young rabbits are found dead without the attendant having hitherto noticed them to be ill. As in the liver form, death usually takes place during or soon after an attack of convulsions, not infrequently accompanied by shrieks or crying. Some authorities mention a thickening of the intestinal walls arising during the more chronic course of the intestinal form. Such, however, has not been our experience, the apparent thickening being due to dry,

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hard fæces in the large intestine. Paraplegia may occur in some instances, but whether this is a mere coincidence and due to some other infection we cannot say. What is, however, not an infrequent accompaniment, or perhaps a mere coincidence, is the presence of other parasitic infestations, especially *Cysticercus pisiformis*, which may be found in large numbers in its wandering or free stage in the peritoneal cavity after its migration from the centre to the circumference of the liver, or in its encysted state in the great gastric ligament, and sometimes in the ligaments of the pelvic viscera, but rarely in other situations. The lesions other than those caused by coccidia are fresh trails or cicatrices of an opalescent or translucent greyish appearance.

Moisture favours segmentation of the oöcysts, and there is no doubt that the succulence of green food favours an increase in moisture of the fæces, which outside the body accounts for the increased incidence following this dietary, just in the same manner as the diarrhœic stools do. Where there is no free oxygen, oöcysts may be preserved in contact when the carcase of a rabbit dead of coccidiosis has been kept in cold storage for weeks. On the contrary, as soon as they reach the outside world where there is free oxygen, they commence to segment, and this is accomplished in about two or three days.

Diagnosis during life is made by microscopical examination of the fæces; after death by examination of the contents of the small and large intestine and of the gall-bladder, of the lesions in the liver and of the intestinal walls, especially of the large intestine.

Segmentation of the oöcysts does not take place in the intestine. The coccidia of rabbits are not transmissible to other species, and the disease occurs as much in hot, dry summers as it does in cold, wet Springs or Autumns, when animals are fed on succulent food. During the Winter months it may, however, occur in young rabbits.

Various forms of treatment have been adopted. Some authorities speak well of mild tarry compounds largely diluted and administered by a stomach tube. Others have recommended sweetened solutions of the same agents which the animals readily partake of by their own accord. Others still favour an oily mixture of thymol or of menthol. Some recommend dimol, salol, B.-naphthol, catechu, sulphate of iron or sulphate of copper mixed with the dry or wet mash. But none of these has proved to be of any value once the segments have penetrated the walls of the intestinal tube, and certainly they have no action on the mature oöcysts, which will withstand the most powerful disinfectants and other agents. Again, when the disease occurs, or before it is recognised, the animals have gone too far, or are dying or found dead.

The only certain method is prevention by strict hygienic means. Nothing short of almost absolute cleanliness either of the food or

surroundings is of much avail. Rabbits in a state of nature very rarely partake of food on ground soiled by their own fæces or urine, but the domestic rabbit is constantly surrounded by its own excreta, which in the majority of cases are always soiling its food, more especially when it is kept on the intensive system, which favours the spread of disease.

Although coccidia do not seem to affect the health of adult rabbits, such rabbits are nevertheless likely to remain carriers and infest young susceptible animals. It is impossible to free adults of coccidia other than by keeping them so clean that they cannot reinfest themselves. A doe about to kindle should be placed in a sterilised hutch to have her young. This hutch should be cleaned out daily. As soon as the young are fit to fend for themselves they should also be put into a sterilised hutch. The best, quickest and cheapest method of sterilisation is by means of a powerful plumber's blow lamp. The hutch should be cleaned out daily unless it is provided with a strong wire or otherwise suitable floor. A good deal of the wire used in the making of floors is worse than useless. It should be of the largest gauge with a suitable mesh. Litters of young creatures should not be mixed up together. Rabbits coming from other people's rabbitries should always be treated with suspicion and quarantined as being possibly dangerous. The food should be given in racks or troughs made so that the young cannot get into them and soil their contents. No more food should be given than can readily be consumed at the meal time.

All food, especially green food, should be collected and stored under the cleanest conditions. Flinging it on the floor which is being constantly soiled by excreta causes it to become contaminated with the segments of coccidia. Rats and mice should be destroyed and birds excluded from the rabbitry for fear of soiling the food with feet contaminated with the fæcal matter of rabbits.

Such precautions are in our experience the only ones for the prevention or mitigation of this too prevalent malady, which appears to be the bane of the rabbit industry. They are within the reach of all, and the results will be in strict accordance with the way they are put into practice.

Infectious Rhinitis or Snuffles.—Next to coccidiosis this malady is a very serious one. Of the two, probably it is the worse in consequence of the affected animals lingering with it for perhaps the rest of their lives, and thus keeping up and spreading the infection.

Its causation has not been settled. It has been attributed to coccidia, micrococci, streptococci, staphylococci, a special bacterium—

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Bact. leptisepticum, *Bacillus bronchisepticus*, a pasteurella, Influenza bacillus, and many others. Probably it is due to a filter passer.

The period of incubation is from 3 to 5 days, but it may extend to a week or a fortnight or even longer. Its course is usually prolonged especially if it becomes complicated with other infections.

At first there is an increase of the internal temperature taken at the rectum ; the animal goes off its food and appears dull and a few days later there is a watery discharge from the eyes and nostrils with sneezing, followed after another day or two by a thick gummy or yellowish discharge and a snuffling sound. Pneumonia or serous or purulent pleurisy, or both combined, may set in and carry off the animal within a week or two from the commencement of the first signs of illness. In other instances the ear becomes the seat of a thick discharge or an abscess appears on the eyelid, and especially, on the upper or on other parts of the body. Not infrequently it may be mistaken for an acute form of septicæmia in which there are hæmorrhages in various organs, or a more or less serous exudation into the pleural or peritoneal cavities, sometimes both. In other cases there may be encephalitis or cerebro-spinal meningitis with tonic spasms or paralysis.

Prevention should be aimed at by excluding the affected animals and destroying them, and by thorough cleanliness and disinfection. By treating the affected animals medicinally either by internal medication or by nasal irrigations or insufflations the disease is given a longer time to spread.

SMORL'S DISEASE OR BACILLARY NECROSIS.—This is a disease mainly known by abscesses of various sizes appearing on different parts of the surface of the body. It is due to a streptobacillus or streptothrix, first described and figured in 1883, by Lingard and Batt, who encountered it in calf-diphtheria.

This causal organism is found everywhere in nature, but under certain conditions it becomes disease-producing. It attacks wild hares and rabbits as well as the domestic rabbit and other animals.

Infection gains an entrance to the system by wounds such as bites, or from prickly thorns or plants, abrasions or scratches. A favourite situation for its entrance is at the junction of the neck of one of the molars with the gum. Its period of incubation is from 2 to 14 days, and its course is run from two or more weeks.

The abscesses, which vary in number from one to several, appear as firm rounded bodies on the surface of the body. They may vary in size from a pea to a pigeon's egg or a small orange. They neither appear hot nor painful, and contain a thick cream-cheese-like green-

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tinted white pus. They have no tendency to burst and, when cut into, the pus has no tendency to exude. In some instances they appear at the angle of the jaw and under the throat.

When they are numerous or involve the lungs, liver or other internal organs, emaciation becomes extreme and death takes place within two to six weeks. It attacks in other forms such as ulceration beginning at the lips and gradually extending even to the breast. This may also involve the limbs.

Treatment consists in prevention. Medicinal or surgical treatment is not as a rule economical. Still, where it is desired, the abscesses should be opened widely, their contents scooped out and put down the sink, and the resulting cavity mopped out with a 10 per cent. solution of chloride of zinc. After a few days the cavity may be dressed with strong tincture of iodine, which should be repeated every third day until the wound has disappeared. A feature of these abscesses is that they have no inclination to disperse of their own accord, nor when evacuated to repair.

SPIROCHOSTOSIS OR VENT DISEASE.—This chronic infectious disease, sometimes termed rabbit syphilis, is very widely spread, especially among the more highly-bred varieties. In some countries it is said to occur in 25 to 90 per cent. of the rabbits examined ; it is not rare in wild rabbits, and it occasionally decimates hares on some estates.

Since Ross in 1912 called attention to the fact that he had discovered in the lesions a micro-organism resembling that found in human syphilis, much scientific research has been bestowed upon it. Noguchi denominated the causal organism *Treponema cuniculi* and it resembles in many particulars *Treponema pallidum* of human syphilis.

Natural infection mostly arises by copulation, and in consequence an affected male is capable of transmitting the disease to all the females he serves. On the other hand, an affected doe can transmit it to the male. It may also be transmitted by the infected hutch vacated by a diseased animal. It is frequently seen in young rabbits in which it may give rise to rickets or bandy-legs. Its virulence increases by passage.

The period of incubation varies a great deal, from four or five days to as many months.

It shows itself in the form of small nodules from the size of a millet seed to that of a split pea, and these when they break down give rise to moist ulcers of a diameter from that of a sixpence to that of a halfpenny ; these become scaly or scabby, the surrounding skin being much swollen or thickened. Usually rounded, they may, however,

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take on an elongated outline. They are usually found on the skin covering the sheath or scrotum of the male, and in the female, at the edge of the vulva and may extend to that of the anal region. It rarely involves the mucous membrane.

It may also attack the skin at the edge of the eyelids, lips or face, which becomes ulcerated or the seat of small abscesses. Sometimes there is catarrhal conjunctivitis and occasionally keratitis. These are, however, secondary lesions set up by inoculation of the parts coming in contact with the genital lesions during the time the animal is cleaning itself.

Prevention is to be aimed at. Those animals of any value and worth the expense of treatment may be freed from the infection by one injection of one of the synthetic preparations of the arseno-benzine series. Rarely more than one injection is required. Those animals of no value should be destroyed and their hutches thoroughly cleansed and disinfected. Although this specific treatment brings about recovery, it does not give immunity to a future exposure to the infection.

TUBERCULOSIS.—This is of frequent occurrence, especially in the Angora. It runs a rapid course, and although generalised expends itself mostly on the lungs, intestine, spleen and kidneys, often leaving the liver slightly or not at all involved. It runs its course in two or three weeks. It generally arises by the ingestion of raw cow's milk, but it is sometimes contracted from phthisical attendants or from food soiled with the fæcal matter of tuberculous poultry.

There is only one way of dealing with this fell malady and that is destruction of the affected, tuberculin-testing the remainder and killing the reactors; and thorough cleansing and disinfection of the hutches.

It is not likely to be mistaken for Pseudo-tuberculosis or Pulmonary aspergillosis.

MALLOPHAGIA OR WOOL SWALLOWING.—This is a very frequent cause of death in Angora rabbits. Sometimes the accumulation of wool in the stomach is so great that it forms a somewhat firm cast of its interior, even extending into the pylorus. In some instances small quantities pass through the stomach to set up a fatal constipation in the small or large intestine. Symptoms of ill-health are rarely observed until a few days before death. Not infrequently, finding the animal dead is the only warning that something had been amiss with it.

UMBILICAL HERNIA.—This is somewhat frequent in very fat Angoras, and is not often recognised until the animal is on the *post-mortem* table. A wide ventral opening is less dangerous than a narrow

one in which, in the majority of instances, a loop of the small intestine becomes involved and strangulated.

The safest method of dealing with this condition is the application of a small aluminium clamp to the loosened skin and underlying sac after the viscera has been returned. When the contents of the sac only contains omental fat the hernia is of no moment. There is an hereditary tendency to it.

ANGORA WOOL PRODUCTION, PAST AND PRESENT.*

By J. B. McDOUGALL, M.D., F.R.C.P.Ed.

THERE must be few chapters in the history of live stock culture, in this or any other country, so full of vicissitudes as that dealing with the Angora rabbit. At the beginning of the present century the Angora rabbit was almost entirely a figurehead on the show bench. It was bred more especially in the Northern parts of England by men who admired the rabbit as a thing of beauty, yet capable of improvement. The intrinsic merits of the rabbit as a show specimen became more and more accentuated with the passing of time. During the two or three years preceding the Great War there was a modest but definite demand for the wool of the rabbit for commercial purposes, but in this country no organised campaign for the marketing of the product had been started. Little was done during the years of the war, but it is well to recall that here and there were a few enthusiasts who kept faith with their love for the rabbit and continued to breed specimens which were to form the basis of the foundation stock for the period of boom which was to follow.

At least one enterprising firm in this country made it clear to breeders during the three years following the Armistice that the virtues of the wool of the Angora were so manifest that production on a large scale would be necessary if this country was to hold its own in what was destined to be an important sub-division of the textile industry. It was known that the Angora wool industry had originated during the 19th century in France and that the industry had been developed on sound lines in that country. The real experimental work in a purely technical direction had been done, and it is little wonder that, with large potential markets in view, spinners in this country soon solved the difficulties associated with the spinning of so fine a fabric. The advent of a new industry so intimately bound up with live stock

* A paper presented to the 4th World's Poultry Congress, 1930.

breeding was in itself something to catch the imagination of a large section of the population, but when, in addition, the general consensus of opinion was to the effect that Angora wool could be " grown " at a rate eminently remunerative to the producer there was a veritable influx of people all imbued with supplying the needs of the spinner. Breeders became not only more numerous, but more scientific in their methods. A number of interesting observations on the structure of the Angora wool fibre were made ; meetings between breeders were frequent, and with the price of wool being maintained at 35s. to 40s. per lb. weight there was obvious cause for the enthusiasm which led to further expansion of Angora farms up and down the country. Breeders were led to believe that English Angora wool looked better than the indigent French variety, that it felt better, and, above all, that it sold better when made up into the finished garment. At that time, at any rate, the quality of English Angora wool was on the whole above reproach. A delightful silky fibre was preponderant and finished articles made from nothing but the finest English grown wool left little to be desired.

Those of us, however, who were in close touch with breeders in different parts of the country saw two difficulties which had to be adjusted. First, there was very little co-operation between spinners and breeders. So long as the price for raw material remained firm, many felt that co-operation did not matter very much. A second and more obvious difficulty was that the number of Angora farmers was increasing at an alarming rate, and that it became necessary to investigate the position of markets for finished articles before advising prospective breeders on the important question of taking up this interesting branch of live stock breeding.

Some idea of the growth and expansion of the industry may be gained from the fact that the annual value of the British crop in 1922-3 was £290, and in 1926-7 it had risen to £12,520. The question to be solved was—What was the limitation of the market for the finished product ?

Several interviews were held between one of the chief spinners of Angora wool and members of the Universal Angora Rabbit Club, and it was made clear that the whole question of supply and price of wool was dependent upon the demand by the public for the finished article. No guarantee of any kind could be given ; for the rules which regulate the sale of articles spun from Angora wool are precisely the rules which regulate the sale of most articles which cannot be regarded as necessities. One fact, however, did arise in 1926, and this may be said to be the first intrusion by the spinner on the domain of the breeder—that

with the increased supplies of wool sent in it was becoming necessary for the spinners to exercise greater stringency in grading. Only the whitest wool, of fine silky quality with plenty of lustre, was desired. Thus only those who were capable of marketing wool to meet with these requirements could expect to receive first grade prices. In other words, the increased output of wool by the breeders was forging ahead of the demand by the spinners. It was further becoming increasingly obvious that, as we pointed out in a report to the Universal Angora Rabbit Club in 1926, " the outstanding feature of the situation is that the success or failure of wool farming was in the hands of one firm." Despite this, however, there was still a more important pronouncement of the Bradford Conference of February, 1927, when the Manager of one of the largest firms of spinners in the country said :—" What the future has in store I am absolutely unable to say, but I have been interested for a good number of years, and during the whole of that time, barring small ups and downs, the consumption has gone on steadily increasing, and for what it is worth my opinion is that the outlet for Angora wool is practically unlimited. An article costing 34s. a pound takes a lot of capital, and if the breeders can be helped over slack times it will strengthen their hands and will assist the spinners."

If this statement meant anything it surely indicated the immediate need for breeders to get together. Actually, a Joint Wool Council was set up, but it met with very little response and the negotiations with the different spinners were eminently unsatisfactory. No actual details were available as to the amount of wool imported into this country from abroad, and no concessions of any kind could be secured by the Joint Wool Council from the spinners.

Meanwhile an extraordinary position was developing throughout the country. New breeders were flocking in, and in July, 1928, it was estimated that there were at least 110,000 Angora rabbits in this country. New difficulties had already confronted breeders in the sale of wool : strict and still stricter grading was taking place during 1927, and at last, in the early months of 1928, it was virtually impossible for breeders to sell an ounce of Angora wool at anything approaching the price prevailing during the previous ten years. The first great slump had arrived and breeders were left in a predicament in the absence of markets for their wool.

The subsequent history of this erstwhile flourishing industry makes rather sorrowful reading. Breeders sold their stock where and when possible at the best figure obtainable. Rabbits worth three guineas in 1926 could fetch little more than a few shillings in 1929. Yet the show Angora did not fall from its pedestal—not in quality at any rate. The

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numbers may have suffered, but the inherent desire for the production of the super-Angora is, as judged from present day show specimens, just as great as during the period of boom.

Another phase of the Angora wool industry has been entered into since 1928, and to-day there are three different avenues for exploration by the breeder of Angora rabbits for wool. (*a*) There is a limited demand for first grade wool at about 25s. per pound, a price which is not remunerative as breeding and rearing operations are carried on at present. (*b*) Joining one or other of the small co-operative concerns through which wool is exchanged for garments which in their turn can be sold locally. (*c*) Home spinning of wool. It is in connection with this third proposition that most efforts have been made during the past two years, and there is little doubt that in a number of cases most successful results have been obtained. But if the personal equation was important in times when live stock breeding, and that alone, was the problem, how much more comprehensive will the personality and ability of the worker require to be when breeding, clipping, weaving, not to mention marketing and selling, are all to be undertaken in the same homestead. The actual products of some of these small farms do great credit to those responsible for their administration and, if only the markets for the sale of the produce could be set upon a better footing, the prospects in this direction would be even brighter.

There is, however, no doubt that the solution to the problem of Angora wool production in this and every other country is governed by the old law of supply and demand. If the relatively high prices appertaining from 1922-5 returned there would be an increase in markets for raw material, but we suggest that such increase would merely be a temporary one. The ideal is for spinners to insinuate Angora fabrics into the household as an article of necessity rather than as one of luxury. Experiments in combining Angora wool with artificial silk and other fabrics are useful, but spinners complain bitterly about the cost of the raw material. This opens up at once a further problem awaiting solution—that of the lowering of the costs of production of the raw material. Our methods of housing stock in elaborate hutches, feeding them on specially prepared cereals and other elaborate concoctions may indeed produce fine rabbits, but they also tend to produce expensive wool. The methods of the French peasant on the other hand, who may not keep accurate costings, have not altered for very many years, and he still produces Angora wool at remunerative rates. He deals in small numbers as a rule ; he feeds on the most economical of rations, his labour is not an item of importance, and the while he is growing wool he is adding to the food supply of the household by building up a useful edible article. In other words, the French have

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had experience which tells them that small units, cheaply fed, are better business propositions than large Angora farms run on what has been described as " up-to-date lines." The future is full of interest, for breeders in this country are now well aware, after some twelve years of bitter experience, that the crux of the question is production costs, and in more than one area there are experiments being undertaken to ascertain the best methods of reducing these costs so that Angora wool may become once more a marketable commodity in this country. Our friends in France may rest assured that no stone is being left unturned to solve such questions as " mass-housing," cheap feeding, automatic plucking and the like, all in the hope that we on this side may once more be in a position to sell Angora wool at prices which may be regarded as remunerative.

Still one more aspect of the subject should be borne in mind. It may well be that the Angora wool trade is one of those with a " vicious cycle." The phase of over-production reached in 1928 may well result in a period of great under-production in 1932, more particularly if the textile trade in this country shows signs of revival. Such a cycle has occurred more than once during the past twenty years in France. If a demand for Angora wool ever recurs it will be well for breeders in this country to put into practice at once the lessons regarding co-operation which were so obvious during the time of the boom of 1920-27 but which were left unheeded. Otherwise that vicious cycle will be manifest once more.

ELIMINATION OF ARSENIC AFTER SHEEP-DIPPING.*

By SIR THOMAS OLIVER, M.D.Glasg., F.R.C.P.Lond.,
Emeritus Professor of Medicine in the University of Durham.

In *The Lancet* of March 1st last an interesting paper entitled Sheep-dipping and the Shepherd was published by Prof. I. Walker Hall, of Bristol University, and Mr. Rowland H. Ellis. With the opinions expressed I am in full accord, and should like to add my own experience. A month ago there was sent to me from the Northumberland moors a

* Abstract from *The Lancet*, with the kind permission of the Editor and Author.

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well set-up healthy looking shepherd, aged 35, married, who gave the following history.

After a day's sheep-dipping in August, 1925, a red rash appeared on his skin from the ankles to just above the knees ; the skin was hot and painful. The herd did not lie up on account of it ; he simply dressed the affected limbs with olive oil. By the third day the rash had, practically speaking, disappeared and was followed by desquamation. For several days he was the subject of diarrhœa, for which he could not account. The stools were free from blood. There was no vomiting. He gradually recovered, but 20 of the sheep he had dipped died ; one, which had a sore on its back, during the process of dipping, and six on the following day. By the third day the remainder of the 20 sheep had died. So far as the herd remembers the sheep had no diarrhœa ; they frothed at the mouth and lay on the ground unable to rise.

In August, 1929, this same shepherd, after having dipped over 200 sheep in three days, awoke one morning feeling extremely weak, with his arms and legs so stiffened that he could hardly move them, but as the hours passed the condition of the limbs improved that later on in the day he assisted in leading sheep to the dipper. That evening he drove a flock of sheep to the farm two or three miles away, but at the end of the journey he was so completely exhausted and had such severe pains in his legs that, as he could hardly support himself, he was obliged to go to bed. His speech became affected, that he was with difficulty understood. On the following day there was frequent vomiting attended by acute abdominal pain ; the vomit contained blood, but there was no diarrhœa. Next day, when seen by a doctor his case was diagnosed as acute inflammation of the stomach, and treated accordingly. For a week afterwards patient was the subject of repeated vomiting. At this stage jaundice developed and persisted for a few weeks, attended by considerable epigastric pain. There was marked paresis but no paralysis of the limbs. There was distinct impairment of his mental faculties, and nearly all the hair of his head was shed.

Detection of Arsenic.

It was not until January of the present year, nearly five months after the dipping referred to, that he was able to return to his general duties as a shepherd, but, as he was forbidden to dip, his wages were reduced. He looks healthy and is physically fit for ordinary work. Heart and lungs are healthy, and beyond the abdomen being more tympanitic than usual, the internal organs appear to be normal. The urine is free from albumin and sugar ; knee-jerks are completely

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absent ; blood pressure is 142 systolic and 102 diastolic. I sent a sample of the urine and hair to a chemical laboratory, and the note received states that in both of these arsenic is present. Under this circumstance it would be unwise to allow the shepherd to undertake dipping at present. The interesting point is that according to text-books arsenic is said to be a non-accumulative poison, but in the case I have detailed, although it is more than a year since exposure to the poison, arsenic is still being eliminated by the kidneys and the hair.

The Practice of Dipping.

There is a general opinion among sheep farmers that carbolic acid and arsenic are the most efficient agents in sheep-dipping compounds. They effectively clear the fleece of parasites, but they are poisons. Sheep-dipping takes place two or three times during the year. The times vary in different parts of the country. Here, in Northumberland, we are a little later than in the south. It is highly desirable that the lambs should be dipped during the summer months, two weeks after the ewes have been clipped. They thrive better after a dipping. If the " fly " is troublesome the ewes are put through a bath in which carbolic acid and soft soap have been dissolved, omitting the arsenic on account of the lambs, and sprinkling the body with sulphur instead. The next dipping generally takes place in late October or early November before the ewes are sent away to winter, and again sometimes after their return before being sent to the hills. This not only clears them of parasites but keeps them free from disease when travelling. No matter what dippings have taken place, it is the custom to dip the older sheep in October or November before the tups are put to the ewes. This is not only a hygienic measure, but if satisfactorily carried out the animals need not be handled for some months afterwards.

Among sheep there often develops what is known as " scab," which is liable to assume epidemic proportions and is extremely difficult to get rid of. It is due to a mite which attacks the woolly parts of the animal's body. Instead of an arsenical dip, one containing lime and sulphur, or tobacco juice and sulphur, or carbolic acid and soft soap gives the best results as regards riddance of the pest. The hands and forearms of the dippers are not protected. The men wear a long waterproof apron. If the bath contains an unusually large percentage of carbolic or cresylic acid dermatitis may be induced, but it is the presence of arsenic in the bath which, when absorbed, is probably the cause in the dipper of vomiting and diarrhœa, of the physical weakness complained of, also colic and muscular pains, as well as of a protracted period of indifferent health.

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VETERINARY EQUIPMENTS.

By R. E. ALEXANDER, M.R.C.V.S.,
Leigh-on-Sea.

We are all interested in the methods of our fellow members, and when I wrote a few years ago about Veterinary Surgeries the topic aroused some interest. In this article I propose to make some observations on portable equipment.

I well remember a Veterinary Surgeon in the Midlands whose outfit impressed me very much. The rear part of his two seater car was built up into an extraordinary complicated system of drawers and compartments, neatly filled with every conceivable drug and instrument that could be required. Every article was clean and in its proper place.

The astonishing thing was that this man was not a recent graduate. He had been in practice years before I was born. It was a wonderful example of professional enthusiasm maintained over a long period.

On the other side of the scale I have recollections of a recent graduate whose apparatus consisted of a mingled mass of ropes, hooks, colic drinks and bottles flung pell-mell into the dicky of an extremely dirty car.

The canine surgeon is more favoured than the country practitioner. He can, if he so wishes, carry everything on his person. With a hypodermic syringe, a case of hypodermic pellets, a small wallet of instruments, and a bottle each of iodine and chloroform, he can face any emergency. Personally, I always carry a bag. It makes me look, remotely at any rate, like a medical gentleman. On the occasions when I leave it behind I am not infrequently told that the piano does not require tuning, or that the premium is not yet due on the comprehensive policy.

Have we not all noticed that our bags frequently get the better of us? In a virtuous mood, and a slack period, we will empty our bags or attache cases and rearrange everything very neatly. Serums this end, powders that, plaster bandages, pills, and other oddments each in its appointed place. A week later we can't find anything when we need it. The bag won't shut properly: the box of dusting powder splits open and covers everything with a bloom-like veneer. The ointments have been inclined to ooze in an uncontrollable fashion ever since you left your bag that night by the hot radiator. When things get too bad you are overcome by another fit of rectitude and overhaul your bag again. And so the cycle goes on.

The country practitioner, of course, frequently has to carry a lot of odds and ends. Some years ago I was assisting a gentleman who

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carried all his impedimenta in a large square leather case. It contained three drawers that slid in and out in a very captivating fashion. Late one stormy night we were called out to see a horse that had injured itself falling over a cliff. We climbed into the Ford and drove as near our destination as possible. It was in a fairly mountainous country and to reach the farm itself we had a walk of about a quarter of a mile through fields, at this time a mere mass of mud. My companion carried the hobbles, etc., and I carried the square case.

I emphasize its squareness. It rubbed against my legs every time I took a step, and when I stopped and changed hands the drawers kept sliding out. The rain beat in my face and I was slipping about in the heavy mud, occasionally going nearly knee deep in a rut. And all the time that case grew heavier and heavier. I was arrayed in a heavy overcoat and woollen muffler, so that despite the inclement weather I was wet with perspiration.

I tried carrying it like a baby, but even that was tiring. So we changed over, and my companion staggered along with it. After a little while he grew thoughtful, and then said :

" Let me see, what did K . . . say was wrong with this horse ? "

" A wound in the foreleg that has cut through the tendon."

" Really then, we will only need some needles and sutures, iodine, ointment and a bandage."

He groped for the said articles in the sliding drawers, put the box under a hedge, and said we would pick it up on the way back.

I never remember that box being taken out of the car again.

The ideal case is built on the new expanding principle, and the leather compartments are so stitched that they never come asunder. The bottles supplied with the case fit perfectly and are made of a special glass very difficult to break. The whole affair is so ingeniously arranged that with ordinary care it never gets out of order.

I wish I had one.

Clinical Articles

Cerebellar Hæmorrhage in a Dog.

By W. P. BLOUNT, M.R.C.V.S.,
Derby.

Subject.—A six months old mongrel male terrier.

History.—For several months the dog had not seemed normal in that there was occasional sickness, and a tendency to anal irritation.

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Four days previous to the veterinary examination the animal had been taken to an unqualified practitioner who suggested that the excessive heat had affected the animal, or that there might be a bone lodged in the abdomen.

Signs.—A sudden attack of sickness associated with an apparent fit first made the owners realise that there was something radically wrong. The dog would howl, appear dazed, lose control of the limbs, and whine for long periods.

Examination.—The temperature and pulse were normal. The bowels were definitely constipated, sickness was still present but had no special features; the conjunctival membranes were dirty and slightly injected. As it was late at night and as the howling-whining seemed to dominate the case a dose of morphia was administered.

It was learnt next morning that the night had passed fairly quietly, but that the dog was uneasy. A deep enema was given but failed to penetrate far into the intestines. The fæces which it did remove were hard and dark. An hour later a second enema was given but with no better result. Cascara evacuant and liquid paraffin was given by mouth, the animal placed on a fluid diet, and a gastric sedative mixture left containing bismuth, pepsin and H.CN., etc. The following morning a further enema was given which passed freely into the small intestines, no pain was shown, and as the animal appeared brighter, it was assumed that he would soon appear normal. Progress was good for two days when further howling occurred. The head was held flexed to the right, there was great muscular inco-ordination, and it was assumed that there must be actual brain lesions present and not merely effects of intestinal intoxication. Zinc and Valerian pills were left as a palliative, but as the continual crying, etc., was obviously affecting the owner's "nerves" it was decided to destroy the dog.

Post-mortem.—All organs were normal except the following. An enteritis was present commencing at the approximate junction of the ileum and jejunum increasing in intensity towards the caecum, but ending about six inches before that organ. Oval, raised patches of mucous membrane were characteristically present every two or three inches distant in the inflammatory area.

The caecum was thickened and atrophic.

Great care was taken in the dissection of the brain and in its removal from the cranium, but the only lesions seen were the presence of hæmorrhagic material (in character like the contents of many inter-digital cysts:—strawberry-like, degenerate, and apparently about to

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form pus) occupying the site of the choroid plexus (plexus choroideus ventriculi quarti).

Discussion.—The writer is tempted to think that the symptoms were largely due to the absorption of toxins from the intestines, which acting on the choroid plexus caused degenerative changes which would naturally effect the secretion of cerebro-spinal fluid, this in turn could presumably have caused the signs which were exhibited.

Many practitioners would, no doubt, consider the case as one not atypical of one type of distemper.

There appeared to be no relationship to hysteria.

After the very interesting article by Mr. Howard Dawes (West Bromwich) in the *Veterinary Record* of some weeks ago, this small contribution to the subject of the clinical study of the brain of the dog may be of general interest.

Unusual Case of Wound Infection.

By A. STEWART WATSON, M.R.C.V.S.,

Westcliff-on-Sea.

LATE one night about three weeks ago I received a call to visit a cat which had been lost for forty-eight hours and had just returned with a bad bite in the leg. Arriving at the house I found a tomcat with a large punctured wound in the hock, frothing and hissing as if just dressed with peroxide of hydrogen. Another wound in the scrotum presented the same appearance. Both wounds were full of the liveliest maggots I have ever seen. I advised an overdose of chloroform but was asked to do everything possible to save the poor creature. I gave the animal chloroform in a box and that was effectual in cooling the maggots down. I removed over thirty from the scrotum alone, together with two half-eaten testicles, tunica vaginalis, and debris. The hock contained about forty and a round dozen popped out of the rectum. The animal was under chloroform for over thirty minutes before the wounds were cleaned out and packed with iodine ointment. A stimulant dose was given hypodermically and I returned to bed.

After treatment consisted of flushing the wounds with hydrogen peroxide and packing with the iodine ointment every four hours. The scrotum did well and on the second day the cat fed itself, but the hock grew rapidly worse. On the third day the joint capsule gave out and sloughing of the tendon sheaths and tendons became manifest.

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Twenty-four hours later the animal died. No internal medicine was given, with the exception of injections of S.U.P. 36 on the second and fourth days.

I offer no excuses for citing this case; frankly, those maggots impressed me profoundly. I feel it may help some other prognoses in that to me it illustrated only too clearly the contention that probably the most dangerous place for one cat to bite another is in the leg. There is no other condition in an adult cat that I regard with such disfavour as a bitten leg or foot—even without maggots.

Abstracts of Current Literature

Hemmert Halswick and Daasch.—Tuberculosis of the Blood Vessels in the Horse—with 10 illustrations.—*B.T.W. June 6th*, 1930.

THIS is a unique and valuable record of a case of the above disease in three horses. The authors characterise it as blood vessel tuberculosis, or multiplex tuberculous calcification and petrification of the vessels. The record states that in three horses with generalised tuberculosis there was extensive calcification of the intima and media of the arteries and of the pulmonary artery, as well as the endocardium, which were due to wasting tuberculous processes. Macroscopically the muscular tissue of the body was unchanged or of greyish brown colour. Microscopically small calcifications could be recognised and lymphocytes, epitheloid cells and langhans grant cells. Infection was endogenous from the vessel lumen, and ectogenous from the tract of the vaso vasorum. Calcifications and tuberculous processes were discernible in the media. There are 10 good illustrations of the lesions found at autopsy.

[All three horses were condemned clinically and seemed to show wasting and bad condition and persistent rise of temperature, but nothing is recorded as to the character of the pulse and heart beats in these cases.—G.M.]

"Avertin" Narcosis.

D. NAUJOKS (*Monatsschrift für Geburtshülfe und Gynäkologie*, February, 1930) has investigated in detail the fatal cases reported following "Avertin" narcosis and considers that many have been

due to errors in technique. Young women stand much larger doses than those in later life. The dosage must be suited to each patient and by means of carbon dioxide inhalations and injections of glucose fatalities should be avoided. A dose of 0.12 gramme per kilogram body weight is given up to a maximum of eight grammes. In fat persons this maximum must not be exceeded. Damage to the liver and kidneys has never been observed. Hyperæmia of the rectal mucosa occurs, but never in his experience has the author seen tenesmus or hæmorrhage. He reports an exanthem following its use which resembled urticaria and covered the trunk and disappeared in a few hours. "Avertin" is of great value at the end of the first stage of labour and also during the second stage. He has found it to be useful in eclampsia when doses up to six grammes controlled the fits. The details of eight cases in which it was used, are appended.—*Medical Journal of Australia*, June 21st, 1930.

Lehr, L.—Foreign Body Surgery of the Stomach and Intestine of the Dog.—*Wiener T.M.*, 16th year, No. 17.

In the Veterinary School of Vienna during the last 25 years 65 dogs have been treated for foreign bodies in the stomach and 230 for foreign bodies in the intestine. On 30 animals gastrotomy has been performed and on 125 enterotomy. The average recoveries have been in stomach section, 75 per cent, in intestinal section, 50 per cent. The better percentage with the stomach operations was due to the fact that bodies in this organ cause less severe general disturbance than in the case of those in the intestine, and further because the hydrochloric acid content of the stomach reduces bacterial flora to a minimum and therefore post operative bad results seldom occur. The less percentage in enterotomy is because the foreign bodies cause severe local disturbances and bring about general intoxication which make prognosis doubtful and often bad. Röntgen rays and the skiagraph have helped considerably in diagnosis.

The operation was exclusively performed in the linea alba. In the lethal cases 70 per cent. succumbed to peritonitis partly brought about by scarcely avoidable soiling of the peritoneum in the operation by cocci and bacilli and partly through passage of these through the intestinal wall on account of pressure necrosis of the foreign body. In many cases there is a sepsis due to absorption of poisonous necrotic products, bacterial toxins and bacteria.

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Reviews

Report of the Veterinary Director-General for Canada for the Year Ending March 31st, 1930. Published by the Department of Agriculture, Canada. Printed by F. A. Acland, Ottawa, 5 cents.

This annual report by George Hilton, V.S., gives a very comprehensive survey of the veterinary activities of the Department of Agriculture in Canada. A permanent progressive campaign is being undertaken against tuberculosis and although foot and mouth disease has been introduced into the country nine times the Veterinary Sanitary Service has eradicated it by energetic and determined action. The last outbreak was due to infected garbage discharged from a merchant vessel at a California port and fed to hogs in that state. It was stamped out two months after being confirmed. Strict embargoes and restrictions are placed on commodities originating from countries where foot and mouth is known to exist. Disinfection of untanned hides and skins in infected countries must be strictly carried out at the tannery to which they are consigned. Outbreaks of anthrax and glanders have been few and even only two outbreaks of hog cholera have occurred which is very gratifying.

Twenty-six herds are receiving attention as regards infectious bovine abortion under the optional plan adopted in January, 1929. The Director-General is now of opinion that the time is ripe for the mustering of all available forces in a united co-operative contr l of tuberculosis. He wants the provinces to share with the Federal Government in providing the necessary funds for the work and for the employment of accredited Veterinary Practitioners in an extensive campaign against tuberculosis. Redwater and swamp fever have caused severe losses and both maladies are being investigated at the Research Institute and the laboratories under the direction of E. A. Watson, V.S.

Two sentences in the report seem of special interest to veterinarians. They are (1) " Difficulty has also been experienced in recruiting suitable men into the service and we have been unable to materially increase the staff " and (2) " Difficulty has again been experienced in obtaining suitable eligible veterinarians for our work. During the past fiscal period 23 veterinarians were given appointment and 11 of these are at present on a temporary basis." No reason is given for these difficulties, but we expect it is the old tale of lack of influence and organisation to blaze the trail of offence and defence and propaganda in quarters that matter.

The reports of Dr. Cameron, Chief Veterinary Inspector, Dr. Watson, Chief Pathologist, and Dr. Barnes, Chief of the Meat Inspection Division are given.

The accredited herds in Canada were 4,653. Herds undergoing accreditation 1,295. Herds awaiting test 149. 1,530 herds are being dealt with under the supervised herd plan and there are 27 municipalities adopting tuberculin testing and giving compensation for reactors. Restricted areas for the eradication of tuberculosis are also being established and in these over half a million cattle have been tested and re-tested.

Dr. Watson has been watching B.C.G. vaccination since 1924 and does not as a result express a favourable opinion as regards it. E. A. Bruce, V.S., has been conducting research into " Nutritional abortion of Sheep "

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and the account of his work will be interesting and instructive to those dealing with sheep diseases.

The meat and canned foods division under Robert Barnes, V.S., furnishes a record of immense activity and the responsible and onerous work has no doubt been well and truly done.

Books on Veterinary and Agricultural Science.

We have been sent by Messrs. Baillière, Tindall & Cox their catalogue of books on Veterinary and Agricultural Science and Animal Husbandry dated October, 1930. This is a most useful catalogue as not only does it contain a complete list of Veterinary books but it enables one to see what books are issued on other subjects. In order that its scope and intention may be appreciated we reprint the following from the publishers' notes introducing the catalogue.

" This catalogue is divided into the following sections :

SECTION I. Pages 1-16.

VETERINARY SCIENCE, which contains those books of direct interest to the Veterinarian.

SECTION II. Pages 17-24.

ANIMAL HUSBANDRY, which comprises books dealing with such subjects as breeding and management (including small animals, poultry, beekeeping, etc.), and also books of interest to some extent to the Veterinarian.

SECTION III. Pages 25-40.

AGRICULTURE, which contains those books of particular interest to the scientific agriculturist and to the research worker.

SECTION IV. Pages 41-45.

ATLASES, DIAGRAMS AND CHARTS prepared for the Veterinary and Agricultural Student ; for those whose work takes them among animals ; and in the case of the Atlas of the Ox, for students of meat inspection and those studying in the classes arranged for butchers' assistants.

SECTION V. Pages 46-48.

PERIODICALS, which is divided up into Veterinary and Agriculture, and Miscellaneous.

It is inevitable that there must be some overlapping between the various sections, but it is hoped that by publishing the above classes of books in one catalogue an opportunity may be afforded the reader of checking over the books available to him on subjects to which at some time he may desire to refer.

This catalogue is, we are informed, unique and is certainly one which every member of the Veterinary Profession should have in his possession. Messrs. Baillière, Tindall & Cox will be glad to send on request copies to anyone who has not already received one.

Notices

Reduction of Price by Spratts.

MESSRS. SPRATT'S PATENT LIMITED, advise us that from Tuesday, November 11th, the prices of all their meat-fibrine dog foods are reduced, the price changes covering small packets as well as the larger bags and quantities in bulk.

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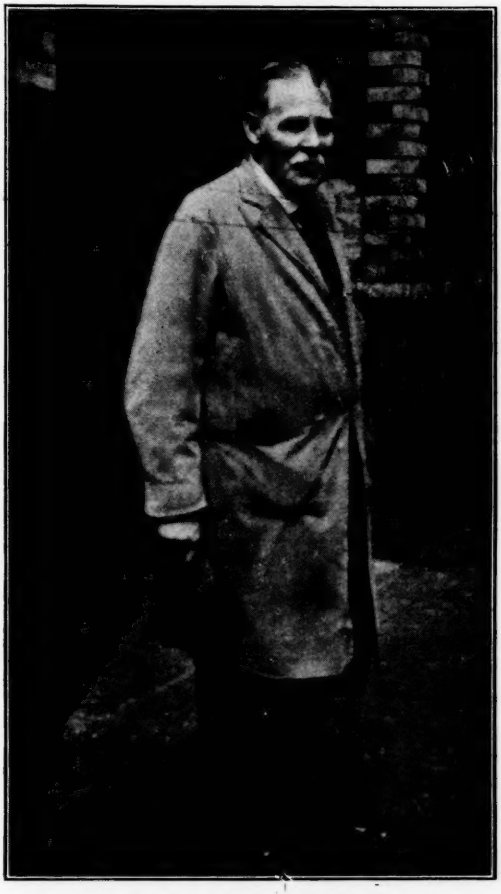
"Harry" Dillon Testimonial Fund.

We have pleasure in giving publicity to the following appeal on behalf of an old and valued employé of the Royal Veterinary College, recently retired, who numbers a host of friends amongst erstwhile veterinary students.



"Harry" Dillon, 1884-1930.

At the end of the summer, 1930, another link with the past was severed at the Royal Veterinary College—"Harry," i.e. Henry Dillon, retired after 46 years. The Governors of the College have recognised his long service, and his closing years will have the comfort and security of a small pension. Owing to the straightened finances of the College, this pension is of necessity small. A few of us met together, and thinking that many old graduates would not like to see "Harry" go without some tangible

recognition of our respect and esteem, we have started a Testimonial Fund. We hope to be able to gather sufficient funds to be able to deal liberally with our old friend and mentor. The duration of Harry's services at the College is nearly without parallel; his ability, industry and old-world courtesy have never been equalled. We call upon all old London Graduates to respond nobly.

(*Signed*) FREDERICK T. G. HOBDAY.
GEORGE H. WOOLDRIDGE.
T. C. WIGHT.
J. MCCUNN.
J. MACQUEEN.
G. A. TOMLIN, *Students' Representative.*

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Subscriptions to be sent to :—
The Secretary,
Dillon Testimonial Fund,
Royal Veterinary College,
Camden Town, N.W.1.

Personal

MR. W. S. CODRINGTON, M.R.C.V.S., of Worthan-under-Edge, has been appointed Veterinary Inspector, under the Contagious Diseases of Animals Act, for Gloucester and District; in the place of Mr. J. R. A. Jones, deceased.

SYMPATHY will be extended to the parents of Mr. Frank Magnier, M.R.C.V.S., whose death as the result of an accidental fall has been reported from Khartoum. Mr. Magnier was a Dublin graduate of July, 1928, his home town being Fermoy, where his popular and genial disposition had endeared him to a large circle of friends.

Publishers' Notices

All communications should be addressed to 7 & 8, Henrietta Street, Covent Garden, London, W.C 2. Telephone: Temple Bar 4646. Telegrams: "Baillière Phone, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than 23rd.

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